Euro-Argo: The European contribution to the global Argo ocean observations network

Claire Gourcuff, Justin Buck, Romain Cancouet, Hervé Claustre, Jari Haapala, Harmut Heinrich, Dimitri Kassis, Brian A. King, Birgit Klein, Gerasimos Korres, Guillaume Maze, Kjell Arne Mork, Grigor Obolensky, Diarmuid O’Conchubháir, Eleanor O’Rourke, Pierre Marie Poulain, Sylvie Poulquen, Andreas Sterl, Virginie Thierry, Pedro Velez, Waldemar Walczowski.

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About 4000 autonomous profiling floats are measuring ocean temperature and salinity up to 2000m depth, all over the globe.

The Argo network delivers essential data both for climate change research and for ocean analysis and forecasting systems.
**Objective**: Coordinate and sustain the European contribution to the global Argo network (1/4 of the network)

- Euro-Argo was part of the 2006 ESFRI Roadmap
- The **Euro-Argo ERIC** (European Research Infrastructure Consortium) **was created in May 2014** with 9 members. Two additional members joined the ERIC in 2016-2017.
- Euro-Argo is a Landmark in the ESFRI 2016 roadmap

**March 2017 active Euro-Argo floats 20% of the global array**

**Increase of the European contribution to the international network**
E-AIMS Project

FP7 EU Project
Coordination Ifremer [January 2013 - December 2015]

16 Partners (Euro-Argo, Copernicus Marine Service)

**Overall objective:** design and test of new float technology and impact for the Copernicus Marine Service

Prepare the evolution of Argo in Europe
Impact of the Argo array on the global ¼° analysis system: observation minus model forecast misfits for all in situ T,S data in 2012.

Global RMSE for 2012 in salinity and temperature

Reference run

without Argo

without ½ Argo

no data assimilated

Turpin et al. 2016
Mean deep ocean temperature misfits in °C between the “truth” and different OSEs for different depth ranges.

Run with Argo up to 2000 m

Run with 1/9 Argo up to 4000 m

Run with all Argo up to 4000 m

Le Traon et al. 2015
Conclusions of E-AIMS

• Recommendations from E-AIMS OSE & OSSE:
  • The Argo array must be at least maintained at its present level of coverage and data quality to constrain CMEMS modelling and data assimilation system
  • Deeper (at least 4000 m) ocean measurements are required to constrain deep T&S model fields. Measurement with a coarse resolution (1/9) seems to be enough to constrain deep T&S model fields.
  • Development of BGC-Argo very much needed.

• New float BGC technology is mature

• Procurement, deployment and processing of new floats can be organized at European level

• E-AIMS conclusions lead to the writing of the “Strategy for evolution of Argo in Europe” document (Euro-Argo ERIC, 2016) - DOI: 10.13155/48526
Euro-Argo is developing the European strategy in coherence with the Argo one

- **Maintain** the Research Infrastructure
- **Extend** its capacity to abyssal ocean (4000 to 6000m), partially ice covered areas and biogeochemistry

Euro-Argo plans to contribute **to ¼ of the global network** and is now starting to implement the new phase of Argo.
National contributions
EU contribution: MOCCCA project (*Monitoring the Oceans and Climate Change with Argo*)

- [2015-2020]
- DG-MARE (EASME grant)
- 150 T/S floats (20% co-funded with Euro-Argo members/observers)
High Latitudes

• Argo is a complementary technology to other platforms, like Ice Tethered Platforms (ITP) in the Arctic, sea mammals, vessels and mooring in Arctic and Antarctic areas.

• Technology has been proven in Weddell Sea with floats able to stay for a long period under ice located with acoustic sources and is under testing in the Arctic in Baffin bay (NAOS project)
  • Collaboration opportunities within INTAROS project (acoustic sources)

• European Argo strategy in the Nordic Seas:
  
  21 April 2017: 44 active floats including 8 BGC floats
Argo extension to depth

- Argo floats (0-2000m depth) give access to ~50% of the global ocean volume
- Deep Argo floats (0-4000m depth) give access to ~90% of the global ocean volume

**Strategy for Deep Argo:** Focus on areas where large deep signals are located, that is where deep-water masses are formed, namely the North-Atlantic Ocean and the Southern Ocean

courtesy of G.Maze & V.Thierry

One year time series [2015-2016] of salinity measured by the deep Argo float 6901758
Biogeochemical Argo

- Biogeochemical-Argo *Scientific and Implementation plan* was finalized this year
  - See dedicated presentation: Hervé Claustre & Ken Johnson
    “Biogeochemical-Argo: achievements, challenges for the future and potential synergies with other components of ocean observation systems”
    (OS3.1/BG9.69 session, Thursday afternoon)

http://biogeochemical-argo.org/
The importance of Argo for the Copernicus Marine service was proven through E-AIMS

Recent R&D studies conducted at European level have shown that Biogeochemical Argo technology are mature

the Deep technology pilot development phase is still ongoing to reach the accuracy needed for climate applications

Euro-Argo has successfully started to organize procurement, deployment and processing of new floats at European level
  • Coordination of national activities
  • European floats (MOCCA project)

Euro-Argo has started to implement the new phase of Argo, following the “Strategy for evolution of Argo in Europe” (Euro-Argo ERIC, 2016)

Work is ongoing regarding sea-ice technology that will enable Euro-Argo to extend its capacity to high latitudes

Note: Euro-Argo is participating in the ENVRI community booth, located in the Exhibition Entrance Hall Yellow level 0 (ground floor), Stands 02-03.